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ABSTRACT

This paper presents a unique method of planning and designing a Web site for e-learning. The following phases are discussed: troubleshooting the project; initial overview of the entire project; dividing the project into small portions and assigning people to each of these portions; periodic studies of the entire project in light of the development of each small portion and how the entire project is fitting together; periodic beta testing by students; the first launching of the project; and assessment of the project. One of the unusual aspects of this planning is troubleshooting using a strategic planning process. Strategic planning is presented in some detail to allow others to use this process in their planning processes. Learning styles are used to determine the course elements for the Web site, and Newton's second law is used as a basis for the distribution of assignments to various team members for the development of the Web site. (Contains 10 references.) (Author/AEF)

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Planning for E-Course Success

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Abstract

This presentation will present a rather unique method of planning and designing a web site for e-learning. The following phases will be discussed: trouble shooting the project, initial overview of entire project, dividing the project into small portions and assigning people to each of these portions, periodic studies of the entire project in light of the development of each small portion and how the entire project is fitting together, periodic beta testing by students, the first launching of the project, and assessment of the project. One of the unusual aspects of this planning is trouble-shooting using a strategic planning process. Strategic planning is presented in some detail to allow others to use this process in their planning processes. Learning styles are used to determine the course elements for the web site, and Newton's second law is used as a basis for the distribution of assignments to various team members for the development of the web site.

We start with a basic law of physics, Newton's Second Law: F = ma. In this equation F is the force, m is the mass, and a is the acceleration. Solving this equation for the acceleration we have a = F/m and we see that for the same amount of force, the smaller the mass the greater the acceleration. Applying this equation to web-site design and development, we have the important principle that to achieve the maximum acceleration of development we need to have the mass at any given time as small as possible. Recognizing the mass as the amount of material on which we are working and the force as our efforts, I think that everyone now quickly recognizes the principle. If we have everyone working on many aspects of the site, the site development will not be achieved at maximum acceleration. We must have the individual team members working on a series of small contributions. However we have to plan initially so that everyone is working on the appropriate assignments in the appropriate order. Therefore planning must be done initially on the project as a whole. After the initial planning, the team needs to have most people concentrating on small portions of the project with periodic reviews of progress as well as periodic reviews of the appropriateness of each component in light of the entire project. Of course if the team consists of one person, the person must divide his/her time wisely so that he/she concentrates on just small portions at a time. Regardless of the team size, the project must consist of the following phases: trouble shooting the project, initial overview of entire project, dividing the project into small portions and assigning people to each of these portions, periodic studies of the entire project in light of the development of each small portion and how the entire project is fitting together, periodic beta testing by students, the first launching of the project, and assessment of the project.

Trouble Shooting

The trouble shooting of the project is a phase that is often ignored or just dealt with as the problems arise. It is much preferable to do a thorough examination of the project initially, in which the strengths, weaknesses, and possible trouble spots are studied. We have found that strategic planning is a tool that lends itself well to this initial phase. Strategic planning is a management tool that was very popular in the late 1970's and early 1980's and is now becoming a popular tool again (McNamara 1999; McNamara 1995). It is a method of managing an organization so that it can do its job better. It is used to determine mission, vision, values, goals, objectives, roles and responsibilities, etc. The process of strategic planning involves intentionally setting goals and developing an approach to achieving those goals. However I have found the process to be very useful in systematically developing an approach to most any application, including web-site design and development. Before proceeding to demonstrate and discuss the application

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to this topic, we need to define some terms within the strategic planning process. While defining these aspects of strategic planning, we will also look at some hypothetical examples of each.

I. Goals

Specific targets or results the group wants to achieve in a short time period of usually one year or less. Goals should be specific, quantifiable, concise, acceptable, and compatible with higher organizational goals. *Example:* CH 1 web site must be ready for use on Jan. 1, 2002.

II. Objectives

Objectives are specific targets or results the group wants to achieve in a longer time period of usually more than one year. Objectives should be specific, quantifiable, concise, acceptable, and compatible with higher organizational goals. As time tables progress, objectives will become goals. *Example:* All core chemistry classes (CH 2, CH 3, CH 4 in addition to CH 1) must be on-line by Jan.1 2003. This objective is compatible with university goals.

III. Strengths (S)

Strengths are factors internal to the group that are considered relevant to the group's competence and over which the group has direct control. *Examples:* The group is very capable with some members having web development experience. All but one of the group members has tenure.

IV. Weaknesses (W)

Weaknesses are factors internal to the group that are considered in need of improvement or change and are detrimental to the group's competence. The group has direct control over these factors. *Examples:* Group members do not have workload allotted to the development of the site by the department chair. One member of the group is not tenured. Not all pieces of the development puzzle are in the group (no one is a programmer).

V. Opportunities (O)

Opportunities are environmental factors external to the group that can directly influence the group's competence in a positive manner if utilized, but over which the group has no direct control. *Examples:* The Presentation Technology Services (PTS) group on campus has much of the software and hardware available for web site development. The university wants publicity portraying the university as technologically savvy.

VI. Threats (T)

Treats are environmental factors external to the group that can directly influence the group's competence in a negative manner if not reacted to, but over which the group has no direct control. *Examples:* PTS is very busy and has an inflexible schedule. There are no university funds for new servers. Time spent on web site development does not count toward tenure or promotion.

VII. SWOT Matrix

Now we can make SWOT matrices, which will be SWOT items applicable to each goal and objective. Note that the S & W are items over which the group has direct control and the O & T are items which impact the department but over which the department has no direct control. We don't actually have to construct the explicit SWOT matrices; the important point is to be able to construct all of the SWOT elements and then to analyze them for a particular application.

Briefly analyzing the above, we see that we have a pretty good team except that we don't have a programmer and that need must be addressed. The programming can be done off-site (expensive) or the team could hire a programmer from an undergraduate or graduate student pool. We see that PTS has the equipment and software needed but we can't depend upon them to provide for people time help. A server must be obtained, so someone needs to determine if another server on campus has available space for the project (usually the case) or if space can be rented. Also the type of material will dictate some particular needs of the server, such as if it needs to be a Real server. One member is not tenured and time spent on

web development does not count toward tenure. This is not an uncommon problem and is a major problem for which we need a solution. We can try to change the departmental and college tenure and promotion committee about the validity of such work toward tenure and promotion in the area of teaching. Also since the university is interested in having publicity about being technically savvy, it seems that the best short term solution is to see if the administrators will allow the work to count in the category of university service, for that category usually does exist in a tenure document.

The time spent in identifying the above specific portions of strategic planning and planning for overall success of the project is very valuable and should never be overlooked. Typically the time required to do the strategic planning is two weeks and this can be very effective use of time. In this hypothetical case, the items have been identified and solutions for possible problems offered. We know that now we are going to develop CH 1 and the other courses will be developed in the designated time line.

Determining Project Components

The second overall step is to determine the specifics about the development of the course. We have to first know our audience (Herrington & Oliver 1995; Kolb 1976; Kolb 1985). Knowing the learner styles of our audience will allow us to develop a web site that appeals to all of those learner styles. This is a critical stage of development that often is overlooked. Once we have determined the needed course elements to fit the learner styles that we will probably have in our course, then we will be ready to begin the web site development. The time to analyze the needed course elements is usually only one week, however the time to then determine which of each element will fit into a particular portion of the web site can be another week. Below is included a portion of a presentation made by the author at EdMedia00 (Combs 2000). This table can save people time in determining which elements are needed for a particular audience.

Learner Type	***Needed Course Elements***
Visual Learners:	Graphics (illustrations, films, slides, and diagrams), flow charts, discussion bulletin boards, and animations.
Auditory Learners:	Films, sound-enhanced slides, Microsoft Net Meeting
Read/Write Learners:	Written web material, referrals to other web sites, written assignments such as chapter summaries, suggested exam questions, etc.
Kinesthetic Learners:	Different web pages for different materials (makes them take a needed break), short web pages, memorization drills, animations requiring input, non-web assignments (surveys, lab experiments).
Sequential or Global Learning:	Give a good overview of each section and provide a logical progression through the material that can be chosen by the learner.
Inductive Approach:	Facts and observations given, principles developed
Deductive Approach:	Principles given, consequences and applications deduced
Active Learners:	These learners need group work. We can make assignments to groups of students and require presentation of results over the web using a course management system such as WebCT. Case studies appropriate to the discipline can be used very

effectively in this component. Reports of these assignments should be due often (every two weeks).

Reflective Learners: These learners need time to think over the material before trying it out. On-line quizzes that are taken at the time of the student's choosing appeals to these learners. A thorough assignment due at the end of the semester also appeals to these students.

Now if we want to develop the course for all types of learners – which we should – we see that we need on-line quizzes, bulletin boards, chat rooms, e-mail, overview of each section, appropriate graphics, flow charts, animations, films, sound-enhanced slides, and written material corresponding to the requirements listed above. All of this material also needs to be set up in such a way that students can easily choose which sections they need to attend at any given point in their study – student-centered direction.

As it is very important that we understand the learning styles of students, it is equally important that students understand their learning styles. We recommend the establishment of a web site that can be used by the students to understand various aspects of their learning styles. We set up a learner skill evaluation site that can be used by others as well: http://erkki.kennesaw.edu/skills/ .

Task Assignment

Now the trouble-shooting has been completed, the types of material needed for the entire course has been determined, and we are now ready to assign tasks to various members of the team to continue our design process (Demeester 1999; Henke 1997; Mackintosh 1999). Content experts need to begin writing the content along the guidelines developed during the study of learning skills of students. The content experts then are not to just reproduce their notes. The written material needs to concisely explain some topics in each chapter and each section needs to have web-based material such as other web sites pertaining to the same material, videos of selected material, animations appropriate to the section, interactive java applets helping the students to practice their understanding, an audio slide presentation of an overview of each chapter, and quizzes placed appropriately in each section of each chapter. Some of these content items will be created by other team members so the content experts will have some means of communicating to such members the exact type and content of the needed additional material. Also everyone must remember the a = F/m principle so that although everyone knows the overall project, all team members are individually working on small pieces of the project. Such projects are rather massive, and the completion of small pieces is very rewarding feedback to each member.

Project Production

Timelines need to be established for every portion of the project with dates also established for a comprehensive examination of the total project during development (Oliver, Herrington, Omari 1996). Teams of student volunteers need to be established that will serve as beta testers for the project as it is being developed. The development team must never forget that the project is being developed for student success. This must also be considered an iterative phase for as pieces of the project are developed, modifications of the flow of the project may be envisioned that were not determinable before beginning the project. Every team member must stay flexible and be willing to modify content and flow as the project matures.

Product Launch

After the process of Trouble Shooting → Component Planning → Task Assignments → Project Production → Beta Testing, comes the long awaited day of launch. It is recommended that the first formal offering of

the course be to a small group of students who will also be involved in recommending changes and/or additions to the project. However the process is never over as the site will have to be continually monitored for updating web references and for monitoring each area for learning effectiveness.

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